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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,896	12/27/2005	Masanori Sakai	1592-0201PUS1	2272

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EXAMINER	
CHANDRA, SATISH	
ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
01/27/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/529,896	SAKAI ET AL.	
	Examiner	Art Unit	
	SATISH CHANDRA	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 3 - 16* is/are pending in the application.

4a) Of the above claim(s) *11 - 15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3 - 10 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/1/05, 12/27/05, 12/8/06, 9/26/07, 10/2/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1 – 4, 6, 8 – 10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda et al (JP 2002-324760) in view of Saito et al (US 2002/0073923) and Kim et al (US 2003/0070617).

Toyoda discloses: regarding claims 1, 8, 10 and 16, a processing apparatus (Figs 1A, 1B, 2A, 2B) comprising an inlet for a plurality of reaction gases such as mono-Silane, SiH4 with mono-Germane GeH4 wherein electrodes 5 (plasma generating device, Fig 1B) including a gas introducing nozzle (not labeled) and a plasma introducing nozzle 7 (hydrogen discharge tube, Fig 2B) for generating hydrogen plasma is disposed in the space where substrates are processed. Gases are exhausted through an exhaust pipe 18.

Toyoda does not disclose: regarding claims 1, 8 and 16, a cleaning gas supply unit for supplying cleaning gas, a post-processing gas supply unit for supplying post-processing gases, said post-processing gas supply unit includes exclusive supply nozzles for independently supplying each of the reaction gases, said post-processing gases include all reaction gases used when said substrate is subjected to the desired processing; said controller controls said post-processing gas supply unit to supply all of

said post- processing gases to said reaction container after the cleaning gas is supplied to said container and before the substrate is placed in the container, and wherein said controller controls the post-processing gas supply unit to supply all of the reaction gases alternately from the exclusive supply nozzles.

Saito et al disclose:

Regarding claims 1, 8 and 16, a substrate processing apparatus comprising:

A reaction chamber 11 (Fig 1)

An exhaust port 61 (Para 0099) for exhausting gases from the reaction chamber

A gas supply system 35a, 35b, 35c and 35d for supplying at least a plurality of reaction gases (such as DCS, SiH2Cl2 and ammonia, Para 0093, 0094) to the reaction chamber wherein the gas supply system comprises:

A cleaning gas supply unit, 35d (Para 0097) for supplying cleaning gas (such as HF, Para 0097) to the reaction chamber through the inlets 64a to 64c clean the lower portion and the inner wall of the inner tube 13, and gradually goes upward to clean the upper portion thereof (Para 0151). Post-processing gas supply units (reaction gas supply units) 35a, 35b for supplying post processing gas exclusively through the gas supply pipes (nozzles) 31a, 31b, 31c in the reaction chamber (Para 0093, 0094, 0095 and 0097) wherein each of the reaction gases supplied from the post processing gas supply units remove the element remaining in the exclusive supply nozzles and the reaction chamber and form a desired film in the reaction chamber. Saito et al further discloses a method for removing the fluoride hydrogen gas used for (Para 0176) cleaning the apparatus by alternately repeating supplying and vacuuming nitrogen

(purge) gas. For example, as illustrated in the sequence diagram shown in FIG. 5 (Para 0177), after cleaning the apparatus with the fluoride hydrogen gas and vacuuming the gas, the cycle of supplying and vacuuming the nitrogen gas is repeated for eleven times (eleven cycles). Then, the fluoride hydrogen gas which remains within the reaction tube 11 and the exhaust pipe 63 can be removed. Decompressing the reaction tube 11 and supplying the nitrogen gas there into are repeatedly performed (Para 0186) for a given number of times, for example, three times (three cycles). After having thus repeated decompressing the reaction tube 11 and supplying the nitrogen gas there into, in a case where the reaction tube 11 is decompressed, the valve VB5 is open so as to supply alkoxysilane (preferably TEOS) into the reaction tube 11 (Para 0187) from the third gas source 35c. In a state where the pressure within the reaction tube 11 is controlled approximately at 133 Pa after the opening degree of the combination valve CV is controlled, exhaustion of the gas is continuously performed for a predetermined time period, for example, two minutes or so.

A controller 75 for controlling the function of all the valves 35a to 35d, 36a and 36b and controls the temperature of each part of the apparatus (Para 0122, 0124). The controller 75 automatically controls a series of processes by sending a control signal, etc., to each part of the apparatus. In Para 0176, Saito discloses alternately supplying and vacuuming nitrogen purge gas. In Fig 6, Saito shows for example, different steps of a process such as cleaning the apparatus, then vacuuming to remove the cleaning gas (and removed deposits in the cleaning gas), supplying a purge (nitrogen gas), then

again vacuuming, supplying a reaction gas (post processing gas), again supplying nitrogen gas and then again vacuuming (Para 0176 through 0195).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide cleaning gas containing fluorine in the apparatus of Toyoda as discloses by Saito et al; provide exclusive gas supply nozzles for independently supplying each of the reaction gases in the apparatus of Toyoda as taught by Saito; provide a controller for controlling reaction gases and post processing gases in the apparatus of Toyoda as taught by Saito; alternately supply and vacuum nitrogen purge gas in the apparatus of Toyoda as taught by Saito.

The motivation for providing a cleaning gas containing fluorine is to remove the residue from the apparatus after processing in the apparatus of Toyoda as taught by Saito.

The motivation for supplying independent supply nozzles is to provide nozzles for independently supplying individual gases for film formation in the apparatus of Toyoda as taught by Saito.

The motivation for supplying a controller in the apparatus of Toyoda is to supply a controller for controlling the various aspects of operation in the apparatus of Toyoda as taught by Saito.

Toyoda and Saito do not disclose: regarding claims 1, 8 and 16, the said controller controls the post-processing gas supply unit to supply each of the reaction gases alternately from the exclusive supply nozzles.

Kim et al discloses: regarding claims 1, 8 and 16, a valve controller (Para 0011) for alternately supplying the reaction gases in their processing chamber. Kim discloses a deposition apparatus comprising valves (Para 0016) wherein a first feeding valve unit for feeding the unexcited reactive gas to a wafer placed in a vacuum chamber; a second feeding valve unit for feeding to the wafer the gas ionized by the plasma of the plasma generator; and a purge valve unit for feeding a cleaning gas after the operation of the first feeding valve unit and the second feeding valve unit. Kim further discloses in Para 0017, the excited gas in the plasma generator, the unexcited reactive gas, and the cleaning gas are provided under the control of the valves, and the thin film is deposited by performing a provision cycle consisting of the sequential feeding of the second reactive gas, the cleansing gas, the first reactive gas, and the cleansing gas, once or many times. In Para 0034, Kim discloses a valve operating unit, function, in concert, to feed the gas ionized by the plasma of the plasma generator 7 and the reactive gas of the reactive gas generator alternately into the chamber and to supply a cleaning gas subsequent to the feeding of any of the reactive gases.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a valve controller or optimize the controller of Saito in the apparatus of Toyoda and Saito as taught by Kim et al.

The motivation for providing a valve controller or optimizing the controller of Saito is to alternately supply process gases in combination with any other gas in the apparatus of Toyoda and Saito as taught by Kim.

Toyoda does not disclose: regarding claim 3, each of the reaction gases supplied from said post-processing gas supply unit removes the element remaining in said exclusive supply nozzles and said reaction container, and the reaction gases form a desired film in said reaction container.

Regarding claim 3, Saito et al discloses, each of the reaction gases supplied from said post-processing gas supply unit removes the element remaining in said exclusive supply nozzles and said reaction chamber, and the reaction gases form a desired film in said reaction chamber. It is the intended use of the apparatus and the apparatus of Toyoda and Saito et al is capable of supplying reaction gases from the said post-processing gas supply unit to remove the element remaining in the said exclusive supply nozzles and the said reaction chamber and the reaction gases form a desired film in the said reaction chamber.

Toyoda discloses: regarding claim 4, supplying a plurality of reaction gases such as mono Silane, SiH4 with mono Germane GeH4. Toyoda further discloses supplying hydrogen activated by plasma generating device (electrodes) 5 in their apparatus.

Toyoda does not disclose: regarding claim 4, supplying ammonia gas activated by plasma generating device.

However, it is the intended use of the apparatus and the apparatus of Toyoda is capable of supplying ammonia gas for being activated by plasma generating device in their apparatus.

Regarding claim 6, Toyoda does not disclose: the gas including silicon is SiH2Cl2.

Saito discloses regarding claim 6, the gas including silicon is the first gas DCS (SiH2Cl2, Para 0093).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a gas including silicon is SiH2Cl2 in the apparatus of Toyoda as taught by Saito.

The motivation for providing a gas including silicon is SiH2Cl2 in the apparatus of Toyoda is to provide a specific gas in the apparatus of Toyoda as taught by Saito. Further it has been held the selection of a known material based on its suitability for its intended use is prima facie obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle. 325 U.S. at 335, 65 USPQ at 301.

Regarding claim 9, Toyoda does not disclose: a heating unit which heats the interior of said reaction container.

Regarding claim 9, Saito et al discloses, a heater 16 (Fig 2, Para 0089) surrounding the circumference of the reaction tube 11.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a heater surrounding the circumference of the reaction tube in the apparatus of Toyoda et al as taught by Saito et al. It would have been obvious to a skilled artisan to combine the elements of prior art to yield predictable

results such as providing a heater surrounding the circumference of the reaction tube in the apparatus of Toyoda et al as taught by Saito et al. Setting the temperature in the reaction container when the plurality of reaction gases are supplied after the cleaning gas is supplied and before a substrate is processed lower than the temperature in the reaction container when the cleaning is carried out is the intended use of the apparatus. And the apparatus of Toyoda et al and Saito is capable of performing such functions.

The motivation for providing a heater in the apparatus of Toyoda et al is to provide a temperature device for either heating gases and/or maintaining a desired temperature in the reaction tube of Toyoda as taught by Saito.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda et al (JP 2002-324760) in view of Saito et al (US 2002/0073923) and Kim et al (US 2003/0070617) as applied to claims 1 – 4, 6, 8 – 10 and 16 above and further in view of Fukuda et al (US 2005/0139578).

Toyoda, Saito and Kim do not disclose:

Regarding claim 5, the cleaning gas is a gas including fluorine is supplied from the exclusive supply nozzle which supplies a gas including silicon.

Fukuda discloses: in Fig 2, nozzle 22 for supplying a gas containing fluorine (NF3) is tied into the same nozzle which supplies a nitrogen gas via nozzle 5. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an exclusive nozzle for supplying a nitrogen gas and a gas containing fluorine in the apparatus of Toyoda, Saito and Kim as taught by Fukuda.

The motivation for providing an exclusive nozzle for supplying a nitrogen gas and a gas containing fluorine in the apparatus of Toyoda, Saito and Kim is to provide a single nozzle for supplying a plurality of gases in their apparatus as taught by Fukuda.

Toyoda, Saito, Kim and Fukuda do not disclose: the cleaning gas is a gas including fluorine is supplied from the exclusive supply nozzle which supplies a gas including silicon.

However, it is the intended use of the apparatus and the apparatus of Toyoda, Saito, Kim and Fukuda is capable of supplying a cleaning gas including fluorine is supplied from the exclusive supply nozzle which supplies a gas including silicon.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda et al (JP 2002-324760) in view of Saito et al (US 2002/0073923) and Kim et al (US 2003/0070617) as applied to claims 1 – 4, 6, 8 – 10 and 16 above and further in view of Choi et al (US 6,279, 503).

Toyoda and Saito et al do not teach: regarding claim 7, the cleaning gas is NF3 or ClF3.

Choi et al disclose: ClF3 as the cleaning gas (Column 4, lines 34 – 37).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use ClF3 as the cleaning gas in the apparatus of Toyoda and Saito et al as taught by Choi et al.

The motivation for using ClF3 gas as a cleaning gas is that it is an alternate and equivalent cleaning gas for cleaning the pipe lines, nozzles and the chamber walls in the apparatus of Toyoda and Saito as taught by Choi et al.

Response to Arguments

The arguments relating to the 112, second paragraph rejection, are persuasive and therefore this rejection has been withdrawn. Applicant's other arguments, filed 11/4/2009, with respect to claims 1 – 10 and 16 have been fully considered and are not persuasive as explained below.

Regarding the arguments:

Claims 1, 3, 4, 6, 8-10 and 16 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over JP 2002-324760 to Toyoda in view of Saito and U.S. Pub. No. 2003/0070617 to Kim et al. ("Kim"). Applicant submits the Examiner has failed to establish a prima-facie case of obviousness and respectfully traverses the rejection.

In order to establish a prima-facie case of obviousness under 35 U.S.C. § 103(a), the cited references must teach or suggest each and every element in the claims. See M.P.E.P. § 706.020); M.P.E.P. 2141-2144.

Applicants respectfully submit that this rejection is improper for a number of reasons. First, the base reference to Toyoda is directed to a substrate processing apparatus for film deposition including a reaction container 1 in which process time may be reduced by lowering process temperature by means of the introduction of plasma activated hydrogen for pretreatment cleaning through holes 14 of discharge tube 7 prior to forming a layer of SiGe. Since it is not necessary to raise the hydrogen gas to a temperature higher than the temperature necessary for film deposition, the time for raising and lowering the cleaning process temperature may be avoided. Toyoda only shows a film deposition system in which plasma is limited to discharge tube 7, which controls diffusion of the charged particles from the plasma. This reduces damage to the substrate 2, as described in paragraph [0018] to be deposited with a film of SiGe as described in paragraph [0022]. Toyoda does not discuss post deposition cleaning at all. More specifically, Toyoda does not discuss a cleaning gas supply system for supplying cleaning gas which removes accretion adhering to an inner side of the reaction container by subjecting the substrate to the desired processing, as recited. And Toyoda also does not discuss a post- processing gas supply system for supplying post processing gases after the cleaning gas is supplied and before the substrate is placed in the container by the controller to independently and alternately supply all of the reaction gases through exclusive supply nozzles. Instead, the base reference to Toyoda has provided no showing or suggestion at all regarding any post film formation cleaning or post-processing cleaning. Thus, the base reference to Toyoda is significantly different than what is claimed and, in no way, discloses or suggests the claimed invention.

The Examiner disagrees.

Toyoda discloses a vertical reaction tube apparatus for depositing a film of SiGe on the substrate surface. Toyoda does not disclose providing a cleaning system for cleaning residues from the chamber wall. Applicant please note if film of SiGe is being

deposited on the substrate surface, what would prevent the film of SiGe from not getting deposit on the chamber wall or other chamber internals including the exhaust pipe. Though the reference of Toyoda is silent on this film being deposited on the chamber internal parts, **it is inherent that reaction products are deposited everywhere inside the processing chamber while a deposition film is being formed on the substrate surface.** It appears that the applicant is attacking references individually. Applicant please note, pointing out the differences between the reference and each individual reference is not sufficient to over come a rejection based on a combination of the references. One cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. *In re Keller*, 208 USPQ 871 (CCPA 1981); *In re Merck & Co., Inc.*, 231 USPQ 375 (Fed. Cir. 1986). The test of obviousness is not express suggestion of the claimed invention in any or all references but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them. *In re Rosselet*, 347 F.2d 847, 146 USPQ 183 (CCPA 1965); *In re Hedges,* 783 F.2d 1038.

Regarding the arguments:

Second, the secondary reference to Saito appears to disclose a reaction container 11, an exhaust port 61, a gas supply system 35a, 35b, 35c and 35d for supplying reaction gases to the reaction container and a controller 75 for controlling the gas supply system. The gas supply system includes a cleaning gas supply unit 35d for supplying cleaning gas and the third embodiment, starting with paragraph [0175] describes a post-processing gas supply of nitrogen gas after the cleaning step. Saito fails to show or suggest a controller that controls the post- processing gas supply unit to supply all of the post-processing gases, where all of the post- processing gases include all of the reaction gases supplied alternately. Therefore, the secondary reference to Saito neither discloses nor suggests a controller that controls the post-processing gas supply unit to supply all of the post-processing gases alternately through exclusive supply nozzles, where all of the post-processing gases include all of the reaction gases supplied alternately, as recited in claims 1, 8 and 16.

The Examiner also disagrees here.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Saito discloses a vertical reaction tube for forming deposition films, comprising a separate inlet for the cleaning gas (HF). Saito also discloses a controller (Para 0051) for providing a reaction gas (s) e.g. nitrogen gas (Para 0176) and alkoxysilane (TEOS) gas (Para 0179) after supplying the cleaning gas (Fig 6). Saito further discloses in Para 0192, the gas to be supplied for removing the fluoride hydrogen is not limited to alkoxysilane (TEOS) gas for forming a silicon oxide film, instead, NH.sub.3 and SiH.sub.2Cl.sub.2 for forming a silicon nitride film can be employed. Gas for forming a film to be formed in the reaction tube 11 can be supplied for removing the fluoride hydrogen. Therefore it would be obvious to a skilled artisan to provide a cleaning gas system in the apparatus of Toyoda as taught by Saito to remove reaction products attached to the chamber wall in the apparatus of Toyoda. It would also be obvious to a skilled artisan to combine the teachings of Toyoda and Saito references to yield predictable results such as providing a cleaning gas system in the apparatus of Toyoda as taught by Saito.

Regarding the arguments:

Finally, the Office Action refers to Kim at paragraph [0011] for a valve controller for alternately supplying the reaction gases. But Kim has nothing to do with controlling the application of post-processing gases. In Kim, the controller 30 discussed in paragraph [0011] is merely the conventional controller for

the alternate application of process gases during atomic layer deposition. Kim has only a brief disclosure in paragraph [0034] related to supplying a cleaning gas subsequent to the feeding of any of the reactive gases. There is no disclosure in Kim of a controller for controlling a cleaning process and for controlling a post-processing process as in the instant claims. Kim clearly fails to address the specific claimed features of a controller or control apparatus controlling the cleaning gas supply unit and the post- processing gas supply unit, and therefore cannot remedy the deficiencies of Toyoda or Saito.

Again the applicant is attacking individual references. Toyoda and Saito discloses an apparatus for supplying post-processing gases after the cleaning gas in their apparatus. They do not teach alternately supplying post-processing reaction gases in their apparatus. Kim discloses a deposition apparatus comprising valves (Para 0016) wherein a first feeding valve unit for feeding the unexcited reactive gas to a wafer placed in a vacuum chamber; a second feeding valve unit for feeding to the wafer the gas ionized by the plasma of the plasma generator; and a purge valve unit for feeding a cleaning gas after the operation of the first feeding valve unit and the second feeding valve unit. Kim further discloses in Para 0017, the excited gas in the plasma generator, the unexcited reactive gas, and the cleaning gas are provided under the control of the valves, and the thin film is deposited by performing a provision cycle consisting of the sequential feeding of the second reactive gas, the cleansing gas, the first reactive gas, and the cleansing gas, once or many times. In Para 0034, Kim discloses a valve operating unit, function, in concert, to feed the gas ionized by the plasma of the plasma generator 7 and the reactive gas of the reactive gas generator alternately into the chamber and to supply a cleaning gas subsequent to the feeding of any of the reactive gases.

Therefore it would be obvious to a skilled artisan to modify the controller of Toyoda and Saito to supply the reaction gases alternately in the apparatus of Toyoda and Saito as taught by Kim.

Regarding the arguments:

Claim 5 stands rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Toyoda in view of Saito and Kim, and further in view of U.S. Pub. No. 2005/0139578 to Fukuda et al. ("Fukuda"). This rejection is also respectfully traversed. Fukuda was cited to show a "nozzle 22 for supplying a gas containing fluorine (NF3) tied into the same nozzle which supplies a nitrogen gas via nozzle 5." With all due respect, it is not clear what connection there might be concerning the two cleaning gases NF3 and Nitrogen, as in Fukuda, and the supply of a cleaning gas containing fluorine and a reaction gas containing silicon, as in claim 5. Fukuda fails to establish the connection between these entirely different issues as to claim 5. Moreover, Fukuda also fails to show or suggest a controller that controls the post-processing gas supply unit to supply all of the post-processing gases alternately through the exclusive supply nozzles, where all of the post- processing gases include all of the reaction gases supplied alternately, and therefore cannot remedy the defects of Toyoda, Saito and Kim as discussed above, the comments of which are incorporated herein. Reconsideration and withdrawal of this rejection are respectfully requested.

The Examiner disagrees. Fukuda discloses: in Fig 2, nozzle 22 for supplying a gas containing fluorine (NF3) is tied into the same nozzle which supplies a nitrogen gas via nozzle 5. In other words, gas containing fluorine and a different gas can be supplied through the same nozzle as disclosed by Fukuda. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an exclusive nozzle for supplying a nitrogen gas and a gas containing fluorine in the apparatus of Toyoda, Saito and Kim as taught by Fukuda. Supplying a cleaning gas including fluorine from the exclusive supply nozzle which supplies a gas including silicon (and not nitrogen as Fukuda discloses) is the intended use of the apparatus and the apparatus of Toyoda, Saito, Kim and Fukuda is capable of supplying a cleaning gas including fluorine supplied from the exclusive supply nozzle which supplies a gas including silicon. Here again the applicant is attacking the Fukuda reference

individually. Applicant please note, pointing out the differences between the reference and each individual reference is not sufficient to over come a rejection based on a combination of the references. One cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. *In re Keller*, 208 USPQ 871 (CCPA 1981); *In re Merck & Co., Inc.*, 231 USPQ 375 (Fed. Cir. 1986). The test of obviousness is not express suggestion of the claimed invention in any or all references but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them. *In re Rosselet*, 347 F.2d 847, 146 USPQ 183 (CCPA 1965); *In re Hedges,* 783 F.2d 1038.

Similarly regarding the claim 7 arguments, the Choi reference discloses using ClF_3 as a cleaning gas. Saito discloses a controller for controlling the cleaning and post processing gases. Kim discloses as addressed above supplying gases alternately. Therefore it would be obvious to a skilled artisan to combine the teachings of all these references to yield predictable results such as providing ClF_3 as a cleaning gas and a controller for controlling the cleaning and post processing gases in the apparatus of Toyoda, Saito, Kim, Fukuda and Choi. Pointing out the differences between the reference and each individual reference is not sufficient to over come a rejection based on a combination of the references. One cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. *In re Keller*, 208 USPQ 871 (CCPA 1981); *In re Merck & Co., Inc.*, 231 USPQ 375 (Fed. Cir. 1986). The test of obviousness is not express suggestion of the claimed invention in any or all references but rather what the references taken collectively would suggest to

those of ordinary skill in the art presumed to be familiar with them. *In re Rosselet*, 347 F.2d 847, 146 USPQ 183 (CCPA 1965); *In re Hedges,* 783 F.2d 1038.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Toyoda (JP 2002-280378) discloses a similar apparatus comprising a plurality of electrodes 27 for plasma generation are disposed in the same space with the substrates.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SATISH CHANDRA whose telephone number is (571)272-3769. The examiner can normally be reached on 8 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Satish Chandra/
Examiner, Art Unit 1792
1/20/2010

/Parviz Hassanzadeh/
Supervisory Patent Examiner, Art Unit 1792